Reciprocal beliefs and out-group cooperation: evidence from a public good game

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Reciprocal Beliefs and Out-group Cooperation: Evidence from a Public Good Game

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Abstract

This experimental study examines latent racial prejudice toward out-groups among 152 Spanish college students when they make guesses about the contributions of others in a public good game. Prejudice is examined firstly from the perspective of a two-sided, implicitly-held belief toward any of the specified out-groups: Africans, Asians, Latin Americans and Western. Secondly, from an ordinal perspective of highest negative (positive) prejudice. Lastly models of racial beliefs are fitted for the four out-groups. Results suggest subjects expect Africans and Latin Americans to be less cooperative, but Asians and Western to be more cooperative, than they actually are. We also find that racial prejudices do not have unique determinants across the out-groups under study, nor do the determining factors work in similar directions.

Keywords: Beliefs, Implicit Cognition, Multiculturalism, Prejudice, Public Good Game, Stereotypes

JEL: C91, H41, J15.

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1. Introduction

In recent years, research on prejudice, stereotyping and discrimination has tended to move from a focus on explicit expression - for example racism, sexism, religious persecution - towards the implicit cognitive biases that may predispose towards prejudicial thinking (see Benaji and Greenwald, 2013; Hardin and Banaji, 2012).

Forming accurate beliefs about others' behavior is a prerequisite for social cooperation (Dasgupta, 2009). If stereotypes, like other generalizations, frequently serve as mental shortcuts they are likely to be used when individuals are cognitively challenged (Gilbert & Hixon, 1991). For example, in multicultural settings, stereotypic beliefs by natives (or in-groups) about the cooperative behavior of immigrants (or out-groups) may not simply be a consequence of xenophobia or ignorance. Rather, such beliefs may be based on expectations (erroneous or otherwise) of how foreigners are expected to adapt to public life in the host society.

Where such beliefs are correlated with racial prejudice, they may cause what Loury (2003) describes as "reward bias" or "development bias" against the target victims. The former connotes an unfair treatment of persons based on their racial identities, while the latter occurs where access to resources critical for personal or group development, but available only via (non-market) social mechanisms, is blocked.

Since prejudice is now largely viewed as a socially constructed attitude (see Gergen, 1985) any direct approach to eliciting racial prejudices is seldom justifiable on ethical grounds. Equally, credible indirect approaches to eliciting private racial beliefs without the subject's awareness have been difficult to devise.

In this paper we take an experimental approach to studying the private realm of reciprocal belief formation in social interaction. By use of a reciprocal blind game we look at individuals' beliefs as to others' cooperative behavior when subjects are unaware that the accuracy of their beliefs is being tested.[1] We then use these results to examine causal factors in racial prejudices in an econometric model. We test in particular: the accuracy of stereotypical thinking; whether there is consistency treatment between national out-groups; whether possible determining factors observed work in

[1] Although they are aware that they are being rewarded according to the accuracy of their judgment.

similar directions; and finally the relationship between self report surveys and subjects' performance in the experimental setting.

The remainder of this paper is structured as follows. In the next section we summarize the relevant cross-disciplinary literature and present our core motivation. Section 2 provides a brief overview of the very extensive cross-disciplinary literature. Section three describes our experimental design, and provides an overview of the data to be used in the econometric extension. Section four sets out our main results from two different perspectives: combined prejudice data and an ordinal analysis. Finally, in Section 5 we provide a discussion of the results and summary conclusions.

2. Literature review

Prejudice has long been understood to have some functional attributes, for example the value-expressive or ego-defensive aspects suggested by Katz's (1960) theory on attitudinal functions. Following Allport's (1954) treatise on "The Nature of Prejudice", studies on prejudice and its correlates such as discrimination and stereotyping focused in particular on the contextual environment in which prejudice is acquired or maintained (Adorno et al. 1950; Bandura, 1977; Tajfel et al., 1986). Social psychologists have made the distinction between in-group favouritism and out-group negativity, where out-group negativity is the act of punishing or placing burdens upon the out-group (Tajfel and Turner, 1979). More recently Quillian (2006) has shown the influence of implicit primes on behaviors toward individuals in non-choice groups, even among persons that previously scored low on prejudice in surveys and interviews.

In adjudicating between the dominance of in-group favouritism or out-group negativity as explanatory factors, a consensus around the likely dominance of automatic (implicit or unconscious) processes in racial prejudice is more recent still (see Hardin and Banaji, 2012). A recent current in social-psychological research has suggested that prejudice can often be implicit and unintentional (see Dovidio & Gaertner, 2004), and hence may be partially unavoidable (e.g. Bargh, 1999; Devine, 1989; Dovidio et al 1997). Meanwhile economic-oriented work on specific social situations (e.g. Lowery et al, 2001; Rudman et al, 2001) has also demonstrated that prejudice can sometimes be reduced or even reversed.

If prejudice and discrimination are often usefully viewed as depicting respectively the affective and behavioral aspects of a broader stereotyping phenomenon, (Park and Judd, 2005) it can be argued that less of a consensus exists on the issue of the accuracy of stereotypic beliefs. Hamilton and Gifford (1976) suggested an 'illusory correlation', or cognitive mechanism that mediates erroneous inferences about the relationship between two or more variables, might be responsible for low accuracy in stereotypic judgments. On the other hand, several studies have shown that stereotypic judgments may often be accurate (Jussim et al., 2009; Terraciano et al., 2005; and Yueh-Ting et al. 1995). Jussim et al. (2009) advance the view that stereotypic judgments relating to race and gender may be accurate in some aspects while those concerning political affiliation and nationality are much less accurate.

Finally, economic explanations of discrimination exist that do not require the presupposition of racial prejudice, and these include imperfect information or 'statistical discrimination' models (Aigner & Cain, 1977; Altonji & Pierret, 2001); imperfect competition in dual labor markets and local monopsony models (Doeringer & Piore, 1971; Black, 1995); and racial differences in productivity (Neal & Johnson, 1996).

Our motivation in this paper is to look at the accuracy of reciprocal beliefs concerning out-group cooperation within a realistic social setting. We investigate three questions concerning: the accuracy of an individual's beliefs correlated with actual evidence of how foreign or out-groups actually behave; whether different ethnic or cultural groups (here Asian and Western) are more or less cooperative than they say they are; and finally whether the determinants of (in-group) racial prejudice are the same across different categories of out-groups.

3. Experimental design and protocol

3.1 Experimental design

The experiment was conducted in three waves at the University of Granada, Spain using a linear public good game. The first wave was conducted in 2007 and the last two waves in 2011 with sample sizes of 48, 48 and 56 respectively. Thus, the experiment was run in total with 152 participants selected from the first-year economics students of the university via public calls. The subjects were divided into groups of four each, and the

game was played with the same partners in each group for five rounds. In addition to the first public good task, three other tasks were also included in the experiment.

An endowment of 100 coins (of 2 euro cents each) is given to each subject at the beginning of each round. In Task 1, subject *i* makes decisions on how much to allocate between her private account, and a public account jointly held with the three other subjects in his group. Contributions into the public account are expressed in a number of coins ranging from 0 to 100, i.e. $c_{i,t} \in [0, 100]$. Subject *i's* total earnings here equal the sum of the payoffs obtained from the two accounts at the end of the five rounds. The private account benefit equals each subject's allocation into the account and is independent of the other subjects' decisions. In contrast, the public account benefit is a function of the sum of the allocations by all the four group members into the account, and this is multiplied by a constant factor (1.5), and finally the product is shared equally among them at the end of the five rounds.

On completion of Task 1 by the subjects, the second task begins. This task requires subject *i* to make guesses (beliefs) about the mean contributions into the public account (in number of coins) of the entire group of participants (48, 48, 56 respectively in each wave) in the experiment for each of the five rounds ($g_{i,t}$, $t = 1, ..., 5$).

We create an incentive scheme contingent upon errors, $e_{i,t} = g_{i,t} - \bar{c}_t$ (where $\bar{c}_t$ is the observed mean contribution for each round *t*) such that payment is used as an incentive to focus on correct guesses.

This schema is set out as follows:

- if $|e_{i,t}| > 10$, subject *i* receives 0 euros;
- if $5 < |e_{i,t}| \leq 10$, subject *i* receives 1 euro;
- if $0 < |e_{i,t}| \leq 5$, subject *i* receives 2 euros; and
- if $e_{i,t} = 0$, subject *i* receives 20 euros.

Subject *i*'s payoff in this second task is determined by using only one of the five rounds selected at random. On completion of this task, subjects are instructed on how to compute the "Mean of the Mean Contributions (MMC)", that is, the mean of these mean contributions ($g_{i,t}$) which is the sum of the guess for each round over the five rounds divided by 5:

$$MMC_i = \frac{\sum_{t=1}^{5} g_{it}}{5}$$

Task 3 requires subject *i* to make guesses about the MMC for each of the four foreign population groups (African, Asian, Latin American & Western). The basis of this task is that some similar experiments took place in other parts of the world. For the four foreign groups under study, the real MMC data used in computing the payoffs in this task was sourced from previous studies (Herrmann et al., 2008; and Cardenas & Carpenter, 2008). The payment system and the benefits to each subject in this task are similar to the one previously described in the second task. Subjects' MMC guesses about the foreign groups are compared to the real values obtained for the four foreign groups in previous studies elsewhere. The smaller were deviations from actual values, the higher the monetary reward received by subjects.

Finally, in Task 4 subjects complete a set of questions which are designed to elicit information on the subjects' personal and family characteristics, and beliefs. The English translation of the questionnaire is shown in the Appendix. The complete experiment lasted about an hour with subjects earning 13.47 euros on average.

3.2 Data description

Our research combines two types of data, experimental and survey, which takes into account information on personal and family characteristics, and subjective beliefs. The variables used are listed in Table 1, below, across three categories namely: experimental, personal characteristics, and family characteristics.

Firstly, with regards to the experimental variables, average contribution is calculated as the average of actual contributions made by the subjects in the five rounds, i.e. it takes values between 0 (no contribution) and 100 (maximum contribution). The variable *guess* for locals is obtained in Task 2 and is calculated as the average of the guesses of the contributions made in the five rounds of the experiment. The four variables, guess for the *jth*-foreign group, where j ∈ [African, Asian, Latin American and Western] are obtained in Task 3. Identical to the average contributions in Task 1, the five *guess*

variables (in Tasks 2 and 3) also assume values ranging from 0 to 100 coins contributed into the public account, where 0 represents nothing and 100 full contribution.

Table 1: Data Collected. Variables (excl. Beliefs): Descriptive Statistics

Secondly, with regard to personal characteristics, subject's gender is captured by the variable *female*. *Foreign exposure* is a measure of the number of foreign trips previously taken by the subject, and it takes the value 0 if the number of country trips is lower than three, and the value 1 otherwise. *Sport exposure* is a measure of the number of expensive sporting activities engaged in by the subjects, and it takes value 1 if the subject plays at least one expensive sport, and the value 0 otherwise[2]. The last two variables are used as proxies for the wealth or net worth of the subjects. The last personal characteristic is *political belief;* a variable whose values range from −3 (least conservative) to +3 (most conservative).

Thirdly, *parental education* is a measure of the joint educational status of both parents, and it is calculated as the product of the father's and the mother's educational levels-variables whose values range from 1 (basic education) to 4 (highest education). *Household chore* is a measure of the allocation of household duties among family members, and it takes negative values if chores are borne by the mother alone, and positive values if chores are shared by all, and with the values ranging from −3 (most poorly divided) to +3 (equally divided). This variable helps us to know if a subject's family is of the "traditional or modern" type. *Household culture* is a measure of the schedule (type) of cultural activities engaged in by family members, and it takes negative values if members engage only in indoor activities and positive values if they also engage in 'high' cultural activities (theatre, cinema, etc.), and with the values ranging from −3 (least household cultural activities) to +3 (highest household cultural activities).

[2] Sports considered expensive are: golf, canoeing, rugby, skiing, surfing and tennis.

4. Results

4.1 Guesses

We begin with the incentivized predictions our 152 participants had for other classmates participating in the same experiment, that is, guesses for locals. Figure 1 below shows the histogram and kernel density function. Since the black line is the mean of contributions, all the observations on the right indicate an over-valuation, that is, these subjects believe that their colleagues are more cooperative than they are.

We can see in Figure 1 that the distribution is almost single peaked and skewed to the right, indicating that, on average, locals believe that they are more cooperative than they in fact are.

Figure 1: Histogram of guesses for locals.

First looking at in-group effects, we observe in this section a degree of overconfident judgements. Western subjects self reports indicate that they perceive themselves to be more sympathetic than they in fact are, but on average they are fairly accurate. It is also true that the profile is dispersed suggesting a lot of errors.

Next Figures 2a (top left), 2b, 2c and 2d (bottom right) explore respective guesses for Africans and Asians, Latinos and Western respectively. We begin with guesses about Africans. The most salient difference is that the distribution appears to be twin peaked suggesting that there is no clear consensus. About half the experimental subjects believe that Africans are not cooperative (data below the black line) and the other half suggests the opposite: that Africans are very cooperative.

In Figure 2b (bottom left) we observe guesses toward Asian groups. Again we see little consensus as there is a large degree of dispersion, but the majority of our experimental subjects overestimate the cooperative capacity of Asian people. In Figure 2c (top right) the results are slightly less dispersed, and peaked to the left of the mean, suggesting a somewhat negative perception of Latin Americans. A similar but contrary picture emerges in Fig 2d where guess for Western groups are skewed to the right suggesting a (contrasting) positive bias towards this group.

Figures 2a, b, c & d: Histogram of guesses for Africans, Asians, Latino and Western.

4.2 Prejudices

The results observed in Figures 1 and 2 are not necessarily the result of prejudice. Taking prejudice toward Africans as an instance, we define reciprocal prejudice as occurring when subjects' judgment errors on the cooperative behavior of Africans are significantly different from their errors for locals. Consequently, our primary interest is whether significant differences exist in subjects' judgment errors about the cooperative behavior of the test-groups; and not in measuring errors per se.

Although subjects consider that certain nationalities are less cooperative than they themselves are, e.g. guesses for Latinos, this difference might be just an error of prediction, that is, lack of accuracy. If the same individual makes the same error for Spaniards then, this subject exhibits poor capacity to make predictions rather than negative feelings.

Hence our definition of prejudice precludes this potential capacity for error. We first define errors for locals as follows;

$$error_L = guess_L - contribution_L$$

The first term, $error_L > 0$ indicates an over estimation (or positive feeling) and $error_L < 0$ an under estimation. Now, as seen in Figures 2a-2d, $error_j$ reflects the lack of accuracy toward this *j*-type. We define errors for any population *j*, as;

$$error_j = guess_j - contribution_j$$

Hence our novelty is to offer a definition of prejudice as the difference between errors for locals and for foreign groups as;

$$prejudice_j = error_j - error_l$$

If an individual's error for foreigners is larger than for locals, $prejudice_j > 0$ then this is indicative of positive feelings towards foreign people. (see Appendix: Table A1).

In the combined set of figures below, Figures 3a (top left), 3b, 3c and 3d (bottom right) reflect prejudices for Africans, Asians, Latinos and Western. Here we can see negative prejudices towards Africans (mean=-12.8, p-value<0.01), positive feelings towards Asian people (mean=+14.6, p-value<0.01), negative prejudices toward Latin American

individuals (mean=-15.6, p-value<0.01) and positive views of Western (mean=+13.7, p-value<0.01).

Generally attitudes to Latino and African populations (almost 50% of the total distribution) are similar and negative, with subjects viewing these groups as less cooperative, with a more negative set of views towards Latinos. In fact, prejudices towards Latinos are fairly unambiguous.

Attitudes towards the cooperativeness of Asians and Western are similar, and more positive. In Figure 3d Western are seen as cooperative for almost the complete distribution.

Figure 3a, b, c & d: Histogram of prejudices for Africans, Asians, Latin Americans and Western.

In the following sections we use our output data to examine the determinants of subjects' prejudices toward foreigners from two perspectives: an ordinal (non-cardinal) analysis showing the distribution of highest prejudice by sign; and an econometric analysis of the determinants of prejudice.

4.3 Ordinal Analysis

We offer an ordinal (or non-cardinal) analysis showing the distribution of highest prejudice by sign - that is, highest negative (or positive) prejudice across out-groups (foreign subjects). Our interest here is to compare results from the ordinal analysis with those from the cardinal analysis in the following section.

The resulting distribution of highest prejudice by sign across the four foreign groups is shown in Table 2 below.

Table 2: Distribution of Highest Prejudice by Sign

Spanish subjects have the least favorable view of Africans, closely followed by their views of Latin Americans, while Asians and Western attract more favorable views from Spanish subjects, with the views of Asians the most favorably viewed of the foreign groups. However, if we compare these findings with the mean values from prejudice index we construct (Table A1), we conclude that no discrepancies exist between our

cardinal and ordinal approaches in the analysis of the subjects' prejudices toward foreigners.

4.4 Econometric Analysis

Results for the Foreigners' Prejudice Model are set out in Table 3 below for the combined data.

The regression results indicate that racial prejudice does not have unique determinants across foreign groups and that the determining factors do not work in similar directions. In Table 3, a positive (negative) sign indicates that an increase in the independent variable increases (decreases) the positive prejudice towards a group.

Least squares regressions are fitted for the Africans and Asian data, while quantile regression models with q (= 0.5) are fitted for the other two groups. The dependent variables (ρ_j) are prejudices toward Africans (column 1), Asians (column 2), Latin Americans (column 3) and Western (column 4).

Table 3: Foreigners' Prejudice Model

The independent variables, those set out in Table 1, are average contribution, personal and family characteristics. Firstly, average contribution is a significant predictor of racial prejudice toward Asians only but is not significant elsewhere, indicating that more cooperative subjects tend to have positive views of Asians. Secondly, gender does not affect prejudice - indicating that the sex of a subject is not material in racial preferences toward out-groups. Foreign exposure does appear to significantly influence prejudice toward Africans, but is insignificant elsewhere. Sport exposure is a negative predictor of prejudice toward Latin Americans, a possible indication that wealth status may impact negatively on racial affinity. A positive (negative) sign of the variable Political belief implies that a more conservative subject harbours positive (negative) feelings towards the corresponding foreign group, but this variable is found to be non-statistically significant.

With respect to family characteristics, parental education is a positive predictor of prejudice toward Asians and Latin Americans but again is not significant, perhaps suggesting that a higher level of parental education enhances subject's tolerance, but

only weakly. Household chore exerts mixed but insignificant effects across all racial groups – suggesting that family type does not affect race preferences. Finally, household culture is not significance in any of the foreign prejudice models, indicating that household culture does not influence views on race.

Lastly we can compare the calculated prejudice index with what the subjects answered when asked "*What do you think is the intensity of personal relationships among the following population groups: Africans, Asians, Latin Americans and Westerners where: -3 is an individualistic society and 3 is a highly cooperative society."* For ease of interpretation we have transformed the variable dividing it by 3 and multiplying by 100. The variable "*Reported*" in the table below goes from -100 to 100 where a higher value implies a more cooperative society. The variable "*Prejudice*" is defined above and $prejudice_j > 0$ is indicative of positive feelings towards group j.

Table 3: Comparison of reported cooperativeness and prejudice

It is clear from the table that what they answer when asked about the out-group cooperative behavior is different from the prejudice index obtained from their decisions taken during the experiment. While they say that Africans, Asians, and Latin Americans are highly cooperative (especially Africans) this is not what they show during the experiment. Subjects are more optimistic about out-group cooperative behavior in self-reports than when we judge their behaviour in an experimental social context. This contextual difference in subjects' judgment suggests that 'hidden' negative underlying beliefs, masked in self reports, are unearthed in experimental designs that mimic bilateral aspects of social inter-action.

We make two extensions with results shown in the appendix.[3] First we consider negative views only, the dependent variable is set to equal 1 if negative prejudice exists and set to zero otherwise, for positive or zero values. Second, in line with the analysis in Section 4.3, we run an additional test to check subjects who consider Africans less cooperative (column 1, Table A3) and Asians less cooperative (column 2, Table A3).

[3] Reported in Table A2 in the Appendix, we ran a compensating analysis where we defined *negative prejudice = 1*, if prejudice was less than zero: we did not find noteworthy changes in the results, or substantive differences between models.

5. Summary/Conclusions

We have explored the multiple causation paradigm of discrimination from a behavioral economic perspective. Our goal is to investigate the subjective determinants of implicit racial prejudices in a 'real world' context of social interaction. We focus on two related but important issues: first beliefs about the cooperative behavior of others; and second we explore racial prejudices when subjects are unaware that the accuracy of their beliefs is being tested.

Our experimental design aims to highlight a broad spectrum of attributes for each subject, namely the experimental context, personal and family characteristics, as well as individual beliefs. By using naïve subjects we overcome some limitations in previous studies that have resulted from a single focus on either the perpetrators or the victim of racial prejudice in isolation. Finally, we provide a non-competitive environment that allows subjects to reveal altruism, allowing us to decipher subjects' racial beliefs unobtrusively via their guesses about others' profile of social contributions.

Firstly, we reject the hypothesis of no racial prejudice among college students. In general, the results show that subjects harbour mixed feelings toward foreigners, specifically negative feelings toward Africans and Latin Americans, but also warmer feelings toward Asians.

In terms of the causal factors of racial prejudices, while the overall significance of individual wealth (proxied by foreign exposure and sport exposure) is in line with expectations, there is a divergence between the effects of the two proxies for wealth, foreign travel and sporting activity. The negative sign of political belief on prejudice toward Latin Americans may reflect past historical linkages or an interaction effect.[4] However, these results were not significant.

Turning to the effect of the three socialization variables on attitude formation, only parental education has a positive influence and on attitudes towards Latin Americans. This result may need careful interpreting in the context of Hispanic social history. Meanwhile household chores, included to capture the level of modernity of the subject's family, appears to have a positive influence only on feelings towards Asians whereas this proxy might be expected to have a positive impact across all racial groups.

[4] Recall that a positive (negative) sign of the variable Political belief implies that a more conservative subject harbours positive (negative) feelings towards the corresponding foreign group.

Finally in terms of statistical modelling, our fitted foreigners' prejudice model suggests that racial prejudices do not have unique determinants across out-groups nor do the effects of the determining factors work in similar directions. Subjects tend to harbour mixed feelings toward foreign groups, negative feelings toward Africans and Latin Americans, but are more warmly disposed toward Asians and the Western Hemisphere.

The main results of the study suggest that the accuracy of subject's beliefs is not correlated with actual behaviour observed in a social setting and is non-symmetrical in effect. Moreover, there are differences between ethnic groups, with Africans and Latin Americans expected to be less cooperative than they actually are, but equally Asians and Western to be more cooperative than they actually are. Finally, we find no unique determinants of racial prejudice across all the foreign, or out-groups. These results, obtained in a realistic social setting, appear to confirm the view (advanced for example in Jussim et al. 2009) that stereotypic judgments relating to nationality are liable to be inaccurate, but also suggest that the direction of the inaccuracy is not simple to predict.

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Tables and Figures

Table 1: Data Collected. Variables (excl. Beliefs): Descriptive Statistics

	Mean	Median	Std. Dev.	Min.	Max.
a) Experimental variables					
av. contrib.	35.45	33.5	20.7	0	100
guess (Locals)	39.81	41.5	14.4	3	78
guess (Afr.)	45.11	40	24.4	0	100
guess (Asn.)	45.63	45	19.5	0	92
guess (Lat.)	39.25	40	16.1	2	90
guess (Wes.)	40.12	40	16.6	3	90
b) Personal characteristics					
female	0.45	0	0.5	0	1
foreign exposure	0.37	0	0.5	0	1
sport exposure	0.29	0	0.5	0	1
political belief	-0.02	0	1.2	-3	3
c) Family characteristics					
parental education	5.29	2	5.7	1	16
household chore	0	0	1.6	-3	3
household culture	-0.3	0	1.3	-3	3

Table 2: Distribution of Highest Prejudice by Sign

Foreign Group	**Highest Negative**	**Highest Positive**
Africans	73	8
Asians	0	76
Latin Americans	64	0
Westerns	0	63

Table 3: Foreigners' Prejudice Model

Dep. var = [guess (jth group) – contrib. (jth group)] – [guess (local) – contrib. (local)]				
	Africans	Asians	Latin Amer.	Westerns
a) Experimental variable				
av. contribution	-0.02	0.03**	-0.003	-0.07
b) Personal characteristics				
female	0.59	2.23	0.75	-0.16
foreign exposure	9.27*	2.21	3.41	-1.95
sport exposure	-8.45	-2.15	-6.68**	-2.39
political belief	0.56	1.13	-0.89	-0.27
c) Family characteristics				
parental education	-0.34	0.26	0.24	-0.17
household chore	-0.93	1.01	0.27	0.11
household culture	2.39	0.62	-0.67	0.71
constant	-20.45***	-6.51*	-22.63***	12.83***
	OLS	OLS	QR	QR
*=10%sig.level;**=5%sig.level;***=1%sig.level				

Table 4: Comparison of reported cooperativeness and prejudice

	Reported	Prejudice
Africans	43.3	-11.1
Asians	16.7	16.3
Latin Americans	26.7	-13.9
Western	-3.3	15.4

Figure 1: Histogram of guesses for locals. The thick line is the Kernel density function and the black line is the observed average contribution in this study across the three sessions.

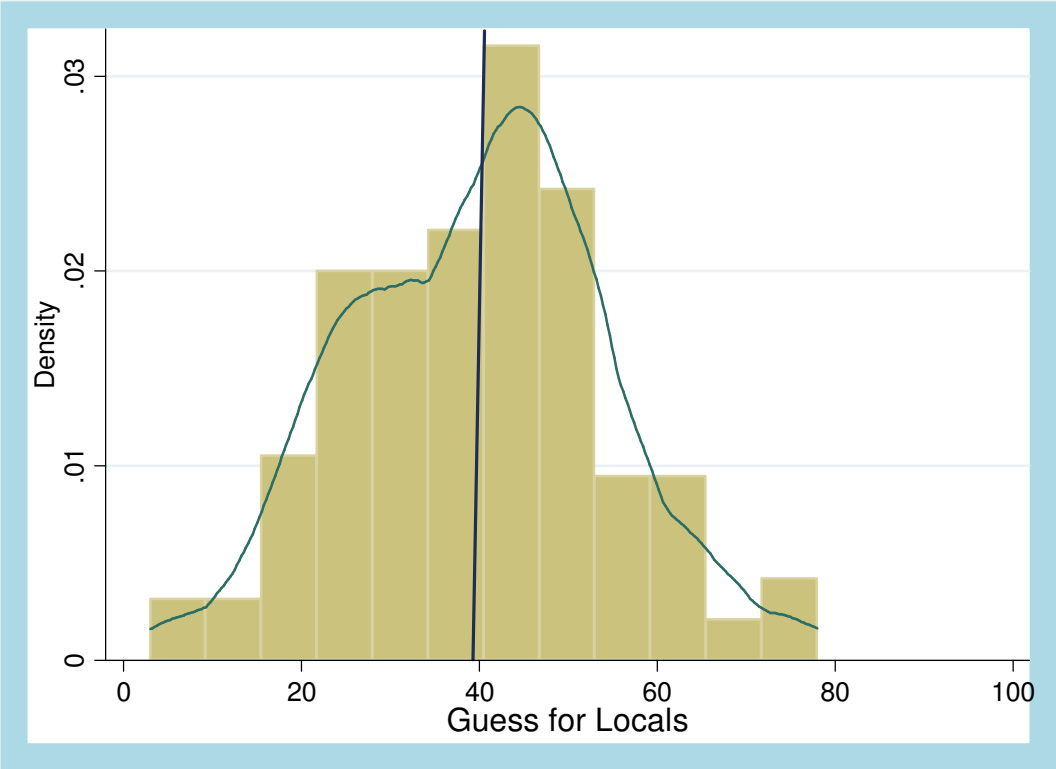


Figure 2a, b, c & d: Histogram of guesses for Africans, Asians, Latino and Westerns. The thick line is the Kernel density function and the black line is the observed average contributions in previous experiments for these population groups (mean=51.75for Africans; =24.89 for Asians, =48.75 for Latin Americans; =20.3 for Westerns).

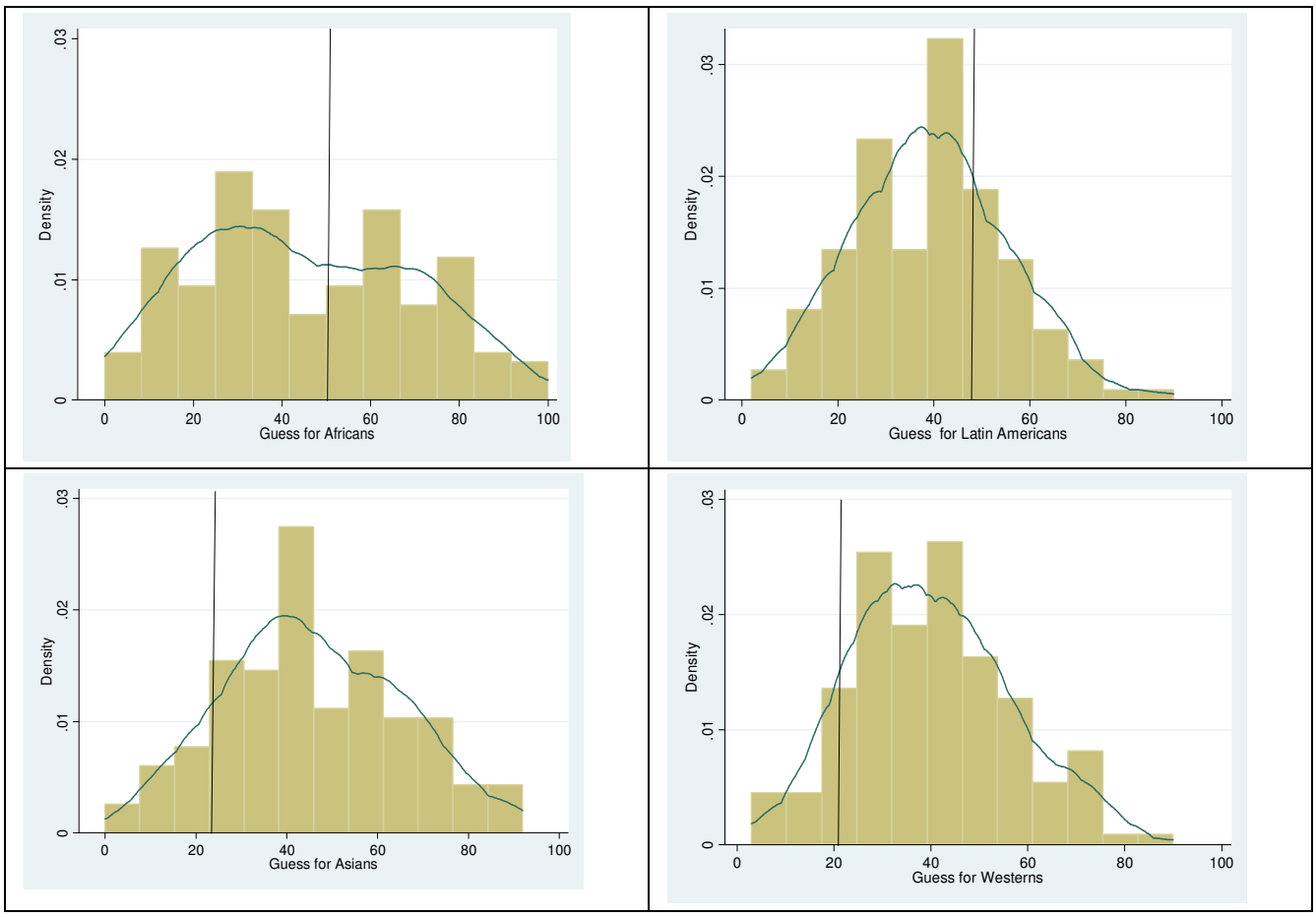
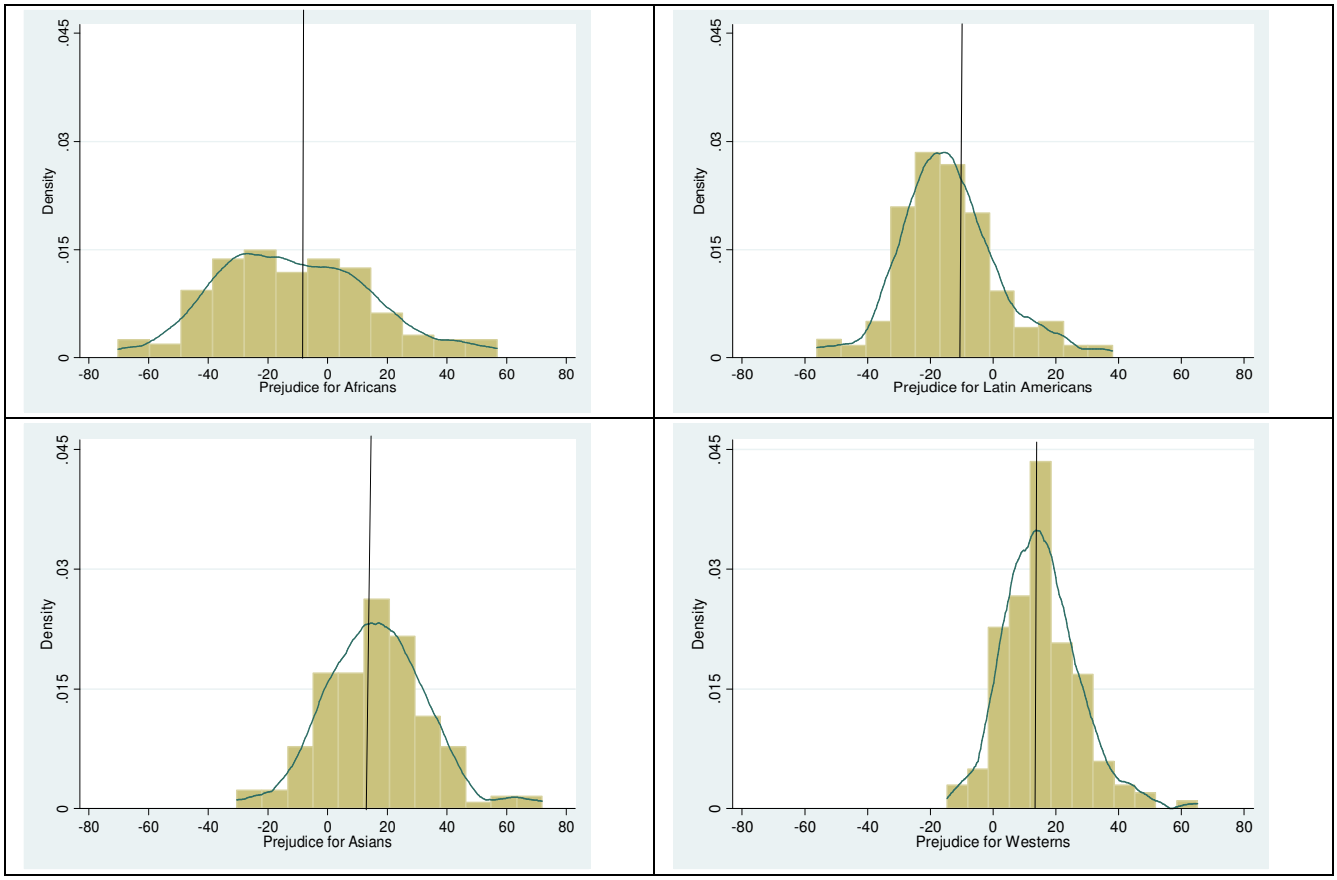


Figure 3a, b, c & d: Histogram of prejudices for Africans, Asians, Latin Americans and Westerns. The thick line is the Kernel density function and the black line is the observed average prejudices in the study (mean= -11.1 for Africans; = 16.3 for Asians, = -13.9 for Latin Americans; = 15.4 for Westerns).



Appendix 1: Tables

Table A1: Prejudice Indices: Descriptive Statistics

Prejudice toward	**Mean**	**Median**	**Std. Dev.**	**Min.**	**Max.**
Africans	-11.1***	-13.8	25.9	-70.2	56.8
Asians	16.3***	16.7	17.2	-30.4	71.9
Latin Americans	-13.9***	-15.2	15.9	-56.2	38.1
Western	15.4***	14.6	12.2	-14.8	65.2
*=10% sig. level, **=5% sig. level, ***=1% sig. level					

Table A2: Foreigners' Prejudice Model (negative=1)

Dep. var = Negative prejudice for jth group				
	Africans	Asians	Latin Amer.	Western
a) Experimental variable				
av. contribution	0.002	-0.03**	-0.004	-0.004
b) Personal characteristics				
Female	-0.16	-0.88*	-0.14	0.12
foreign exposure	-0.54*	-0.16	-0.36	0.39
sport exposure	0.48	1.12	0.39	0.74
political belief	0.004	-0.08	0.2	0.36
c) Family characteristics				
parental education	0.02	-0.05	-0.03	0.002
household chore	0.11	-0.36*	0.08	0.12
household culture	-0.16	-0.13	0.03	-0.12
constant	1.26***	0.31	3.05***	-2.86***
	Probit	Probit	Logit	Logit

Table A3: Foreigners' Prejudice Model (ordered highest negative)

Dep. var = Ordered Highest Negative Prejudice				
	Africans	Asians	Latin. Amer.	Western
a) Experimental variable				
av. contribution	0.003	-0.01*	-0.002	0.01
b) Personal characteristics				
Female	0.46	-0.37	-0.64*	0.46
foreign exposure	-0.61	-0.03	0.49	0.35
sport exposure	0.66	-0.52	-0.46	0.12
political belief	-0.09	-0.11	0.18	0.05
c) Family characteristics				
parental education	0.05	-0.02	-0.09**	0.01
household chore	0.12	-0.07	0.01	-0.02
household culture	-0.37**	0.16	0.31**	0.03
	Oprobit	Oprobit	Ologit	Ologit

Appendix 2: Translation of the experimental instructions (original in Spanish)

WELCOME TO THIS EXPERIMENT

Granada, May 31, 2007

In this experiment you (the participant) will perform several tasks.

TASK 1

Task 1 consists of 5 independent rounds. You will be a member of the same 4-member group during the 5 rounds. At the beginning of each round, each participant receives 100 2-eurocent coins from the experimentalist. Your only decision is on: how much to assign between a Private Account (that is, for you alone) and a Public Account (that is, for all members in your group). Any amount not assigned into the Public Account goes into your Private Account.

The amount you will receive from the Private Account solely depends on the amount of money you assigned into it, and this is independent of the decisions of the other participants. On the other hand, the amount you will receive from the Public Account in your group depends on the sum of the monies assigned into it by all members in your group (that is, the amounts you and the other 3 members in your group assigned into the Public Account). This sum is multiplied by 1.5 and then divided into 4 equal parts. Each of these parts goes to each individual member of the group.

In summary, the amount of money you earn in each round is calculated as follows:

$$Individual\ Earnings = Amount\ in\ Private\ Account + Amount\ received\ from\ Public\ Account\ in\ your\ group$$

Before we start Task 1, remember the following:

- You will play 5 rounds
- In each round you will be given 100 (2-euro cent) coins (that is, 2 euros)
- Your independent personal decision is on: how to distribute/share the money (100 2-euro cents) between your Private Account and the Public Account of your group.

We start Task 1:

- Write in the first row of the form provided (Round 1) how much money you put into the Public Account

- The amount you write must be between 0 and 100
- After you made your decision (wait for a few minutes), you will be informed of the amount of money you have won in the round (we fill out the cell on the right, "The amount you earn")

Round 1

	Contribution to the PUBLIC Account	The amount you earn
Round 1	XXXXXX	(we fill out this cell)
Round 2		
Round 3		
Round 4		
Round 5		

Now we start a second round. You have 100 (2-euro cent) coins to assign between the Public Account and the Private Account. Please write on the second row of the form provided (Round 2) the amount you want to put into the Public Account in this second round. As earlier advised, wait for a few minutes, and you will be informed of the amount of money you have won in this second round.

Round 2

	Contribution to the PUBLIC Account	The amount you earn
Round 1		
Round 2	XXXXXX	(we fill out this cell)
Round 3		
Round 4		
Round 5		

We start the third round …

Round 3

	Contribution to the PUBLIC Account	The amount you earn
Round 1		
Round 2		
Round 3	XXXXXX	(we fill out this cell)
Round 4		
Round 5		

We start the fourth round …

Round 4

	Contribution to the PUBLIC Account	The amount you earn
Round 1		
Round 2		
Round 3		
Round 4	XXXXXX	(we fill out this cell)
Round 5		

Finally, we start the fifth round …

Round 5

	Contribution to the PUBLIC Account	The amount you earn
Round 1		
Round 2		
Round 3		
Round 4		
Round 5	XXXXXX	(we fill out this cell)

The five rounds are over. All the money you have won IS YOURS. Now we start Task 2 and you may earn more money.

TASK 2

Your task is to find out the Average Contribution into the Public Account of ALL THE PARTICIPANTS in this experiment (including yourself) in each of the 5 rounds. In other words, we want you to guess the average amount that all the participants have put into the Public Account in each round. Given that in each round the contribution could be a number between 0 and 100, your guess should also be in this interval.

How can you earn money in this second task? We explain how you can earn money through the following Rule. If the value of your guess is:

- between 5 and 10 above or below the Actual Average Contribution, you earn 1 euro
- between 0 and 5 above or below of the Actual Average Contribution, you earn 2 euros
- exactly equal to the Actual Average Contribution (an integer between 0 and 100) you will earn 20 euros!!!
- otherwise, you earn nothing

Try to make a good guess in each round because we are going to pay you according to your guess in only ONE of the rounds CHOSEN AT RANDOM. Think and try to guess correctly what the Actual Average Contributions in each of the 5 rounds were, and write the numbers on the form provided (Task 2).

- Remember that you should write 5 numbers, one for each round.
- Remember also that each number must be between 0 and 100.

Round 1	Average contribution = ...
Round 2	Average contribution = ...
Round 3	Average contribution = ...
Round 4	Average contribution = ...
Round 5	Average contribution = ...
MCC = ...	

We have already finished.

Just one more thing, calculate the average value of your 5 guesses and record this value where it says MMC. This will be useful for subsequent exercises. This is a measure of what you believe is the average of what it has been contributed to the Public Account in the entire experimental exercise.

We have completed Task 1 and Task 2.

Now we begin the third task.

TASK 3

Several similar experiments have been conducted in other parts of the world using different population sets. All these studies (like the current study) analyze, among other objectives, the same situation as you earlier played, i.e. individuals' contributions into the public account.

Remember that in the previous tasks, you were asked to guess the Actual Average Contributions of this experimental class of participants, and then later to find the average value of these guesses, that is, (the WMM).

Now we will concentrate on similar experiments conducted around the WORLD.

In a similar way that you earlier calculated or guessed the WMM (that is, from your Guesses of the Actual Average Contributions in the 5 experimental rounds for this class), we ask you to think and try to guess correctly the Actual Average Contributions for each of the following population groups (Africans, Asians, Latin Americans and Westerners)[5] in 5 rounds, and now calculate or guess average value of these Actual Average Contributions (that is, the VMM for each of these societies).

For payment (your earnings), we will apply the same rule as earlier stated in the second task; and it shall be for only one randomly chosen group out of the 4 population groups. In other words, ensure that your guess for each group represents your best accurate opinion. As earlier stated, the Rule is: if the value of your guess is:

- between 5 and 10 above or below the Real Average Contribution, you earn 1€
- between 0 and 5 above or below of the Real Average Contribution, you earn 2€
- exactly equal to the Real Average Contribution, you earn 20€!!!
- otherwise, you earn nothing

TASK 3

	Population	Average Contribution
	Africans	
	Asians	
	Latin Americans	
	Westerners	

We have completed the first part of the experiment. Now you can win 40 euros!

[5] Westerners refer to the English language speakers in UK, USA, Canada, Australia and New Zealand.

TASK 4

What you have basically done is: to guess the average contributions of your experimental group (Local), Asians, Africans, Latin Americans and Westerners. That is, you have revealed what you think all these populations groups may have contributed into their Public Accounts. Each of the 48 participants in the current experimental class has chosen a "value" for each population group.

Consider case 1: each participant has written what he thought was the average of the contributions of yourselves. You are 48 in the class and therefore we have 48 values revealed by you. Think of that collection of values, which will be the mean ...? What is the average of the values that you have revealed in each case? We will use again our rule.

Remember the VMM that you have reported in task 2 (you can go back and look at the card). We have 48 values of the VMM, one for each of you. The question is: what is the average of all the reported values?

Well, we want you to tell us what, for you, is the average of all reported VMM. Remember, if the value of your guess is:

- between 5 and 10 above or below the Real Average Contribution, you earn 1€
- between 0 and 5 above or below of the Real Average Contribution, you earn 2€
- exactly equal to the Real Average Contribution, you earn 20€!!!
- otherwise, you earn nothing

TASK 4

	VMM Guess of Mean (Class)

Questionnaire

1. What is the educational level or attainment of your mother?

2. What is the educational level or attainment of your father?

3. Are household chores widely shared at home? (mark in the figure below), where: -3 is sparsely distributed and 3 is equally shared.

−3	−2	-1	0	1	2	3

4. How do you share family leisure? TV Shows (series, competitions etc.), Films, Theatre, Reading ...where: -3 is only indoor leisure and 3 includes outdoor leisure.

−3	−2	-1	0	1	2	3

5. Have you gone abroad? Where? (Name the cities)

6. Do you practice any sport? Which ones?

7. Do you play a musical instrument? Which type?

8. If the rate of per capita income in Spain is 100, what do you think is the rates of per capita income of the following population groups: Africans, Asians, Latin Americans and Westerners?

9. If we assume that the level (or stock) of culture in Spain is 100, what do you think is the cultural index levels of the following population groups: Africans, Asians, Latin Americans and Westerners?

10. If we assume that the level (or intensity) of religion in Spain is 100, what do you think is the index of religious intensity of the following population groups: Africans, Asians, Latin Americans and Westerners?

11. What do you think is the intensity of personal relationships among the following population groups: Africans, Asians, Latin Americans and Westerners? where: -3 is an individualistic society and 3 is a highly cooperative society.

−3	−2	-1	0	1	2	3

12. What do you think is the level of male chauvinism among the population groups: Your class (Local), Africans, Asians, Latin Americans and Westerners?

13. With what political trend do you identify yourself? where: -3 is extreme left and 3 is far right.

−3	−2	-1	0	1	2	3

14. What do you think is the optimal immigration policy?

Thanks for your cooperation.